



Growth and Yield Response of Marigold to Potting Media Containing Different Ratio of Manures

Khushboo Sirai¹, Ghulam Hussain Wagan², Farhan Ali Wagan³, Maqsood Ali Wagan¹

1. Department of Horticulture, Faculty of Crop Production, Sindh Agriculture University, Tando jam, Pakistan
2. Department of Agricultural Economics, Faculty of Agricultural Social Science, Sindh Agriculture University, Tando jam, Pakistan
3. Department of Plant Pathology, Faculty of Crop Protection, Sindh Agriculture University, Tando Jam, Pakistan

Abstract:

The experiment was conducted at department of Horticulture, Sindh Agriculture University Tando Jam, Sindh, Pakistan, to evaluate the Growth and yield response of marigold to potting media containing different ratio of manures. The experiment was conducted in Randomized complete block Design (RCBD). The study comprised of five different potting media containing different ratio of manures treatments including T1= Soil (S)–control, T2 = 50% Farmyard manure + soil, T3 = 50% poultry manure + soil, T4 = 50% silt + soil, T5 = 30% Farmyard manure + 30% poultry manure + soil, Seedlings of marigold were transplanted in Pots. each treatment was replicated three times. The results indicated a significant effect of the treatments observations were recorded for plant height (cm), Width of leaves, number of flowers per plant, number of branches per plant, fresh biomass of flower (g), flower diameter (cm). It was found that all studied attributes were statically significant ($P < 0.05$) and responded by potting media containing different ratio of manure. The maximum plant height (15.113 cm) was obtained from T5= 30% Farmyard manure + 30% poultry manure + soil, 30% Farmyard manure + 30% poultry manure + soil T5 produced maximum Number of flowers per plant (24.13) and maximum branches per plant (4.64), maximum fresh biomass of flower (210.45 g) were observed From the T5= 30% Farmyard manure + 30% poultry manure + soil, followed by T4= 50% silt + soil. Observed (14.997 cm) Plant height, (23.94) flowers per plant, (4.54) branches per plant, and maximum and minimum plant height (10.304 cm), minimum number of flowers per plant (16.31), minimum number of branches per plant (2.88), minimum fresh biomass of flower (150.26 g), minimum flower diameter (10.34) cm, was observed from the T1 =Soil =Control-No manure.

Keywords: marigold, potting media, manure.

INTRODUCTION

Marigold is one of the famous flowers scientific Name: (*Tagetes erecta* L.) Common Name: Marigold) belongs to Asteraceae or Compositae family (Kumar, N., N. Kumar, J. P. Singh and H. Kaushik. 2016). Those flower use for many purposes like non secular / spiritual, birthday party / feature and maximum of the festivals. Marigold flora is to be had in attractive shapes and coloration and sizes. As a result, they're ideal for any lawn ornament or making garlands. Marigold is used both for ornamental and medicinal purposes. It is also used in cosmetic and perfume industry due to its aromatic nature and essential oil contents (Regaswamy, D. and J. Koilpillai. 2014) Because of a brief cropping duration and low funding and care made this flower to turn out to be popular amongst flower growers. In Pakistan, African marigold plant life is sold within the

market as loose for making garland. Aside from reduce flower, marigold especially is used for beautification and additionally panorama flowers due to its variable peak and colorings of plant life. It's far surprisingly suitable as a bedding plant in an herbaceous border and is likewise perfect for newly planted shrubberies offer coloration and fill the spaces. (Arora et al.).

Marigolds have smaller flowers and leaves than most other marigolds. Plants decorate the sunny places of the landscape and attract attention. In addition, amaranth is a very valuable crop for fighting nematodes that parasitism on plants, (Basu, S. D., Roy, S. K., 1975) The aboveground part of the plant contains high-quality essential oils that can be used for the aromatization of soaps in the perfume, cosmetic and pharmaceutical industries. Mycorrhizal symbiosis of arboreal mycorrhizal is widely believed to protect host plants from the harmful effects of drought (Rahbarl, M., Omid, M. and Shahram, S. 2013). Increased water absorption at low soil moisture levels as a result of non-root hyphae. Marigolds are usually annuals that respond to fungal infections, but they do not always show a significant response under restricted conditions Upright Tagetes is the 3rd most important cut flower in the world market after roses and carnations. The flowers of this plant have different colors. They are in great demand and are especially appreciated on Easter and Mother's Day (Blondo, R. J. and Noland, D. A. 2000). It is recommended to achieve Erecta flowering (Acharya, M. M. and L. K. Dashora 2004). The plant has a longer flowering period, so it can be used in a variety of situations in the home garden (Golestani, M., Dolatkahi, A. and Kazemi, F. 2013) Upright Tagete flowers can also be used zipal T sheets of natural yellow-orange pigment helenin (xanthophyll), which is in great demand among national and international companies (Ali, E. F. and Hassan, F. A. 2013). Elekta as a tea with spices (sitkovich et al. It was revealed that the two men had been involved in a series of incidents in which they had been involved in a series of incidents. Upright Tagetes can be used in different situations of home garden and landscape design. This is one of the best plants for planting in rock gardens, flower beds and balconies. In addition to having pesticide properties against nematodes and some pests common in the garden, this plant is also considered a snake repellent in the garden (Sasikumar, K., Baskaran, V., Abirami, K., 2015.). The choice of a good nutrient medium is the basis for the proper management of the nursery and the basis for a healthy root system. Nutrient media for use in container nurseries are available in 2 main forms: soil and organic systems (Hartmann et al. 2007) Compared with soil medium, its main component is field soil, organic medium (the basis of organic matter, which can be compost, peat, sawdust, rice husk, coconut, bird droppings, etc.).

MATERIAL AND METHODS

The experiment was conducted at department of Horticulture, Sindh Agriculture University Tando Jam, Sindh, Pakistan, to evaluate the Growth and yield response of marigold to potting media containing different ratio of manures. The experiment was conducted in Randomized complete block Design (RCBD). The study comprised of five different potting media containing different ratio of manures treatments including T_1 = Soil (S)–control, T_2 = 50% Farmyard manure + soil, T_3 = 50% poultry manure + soil, T_4 = 50% silt + soil, T_5 = 30% Farmyard manure + 30% poultry manure + soil, Seedlings of marigold were transplanted in Pots. each treatment was replicated three times.

Observation Recorded

- Plant height (cm),
- Number of branches per plant
- Number of flowers per plant

- Fresh biomass of flower (g)
- Flower diameter (cm)

Statistical Analysis

Data was statistically analysis to determine superiority of the treatment using ANOVA and least significant difference (LSD) tests. All statistical tests were performed using the computer software Statistic (Ver.8.1).

Procedure for Recording Observation

Plant Height (cm):

Three plants of each treatment were selected at random from experimental units and their height was measured from ground surface to the top with the foot scale and the average tallness was worked out in (cm) at the time of following.

Number of Branches Plant²:

Average number of branches of three plants randomly selected from each treatment was counted visually and there by averages was done.

Number of Flowers Plant²:

Average number of flowers of three plants randomly selected from each treatment was counted visually and there by averages was done.

Number of Leaves Plant²:

Average number of leaves of three plants randomly selected from each treatment was counted visually and there by averages was done.

Fresh Biomass of Flower (g):

The fresh flower weight was recorded to plant-1 each replication of every treatment was measure by analytical balance.

RESULTS AND DISCUSSION

Plant Height (cm)

The marigold plant height results shown in figure 1 showed significant effects of various potting media. ANOVA showed that plant height (cm) was very significantly ($P < 0.05$). The treated average of plant height (cm) was very significant. The result of maximum plant height (15.113 cm) is $T_5 = 30\%$ Farmyard manure + 30% poultry manure + soil, followed by $T_4 = 50\%$ silt + soil. Observed (14.997 cm). Plant height decreased in $T_3 = 50\%$ poultry manure + soil, $T_2 = 50\%$ Farmyard manure + soil, (13.033) and 10.703). As a further result, a minimum plant height (10.304 cm) of $T_1 =$ Soil =Control-No manure was observed.

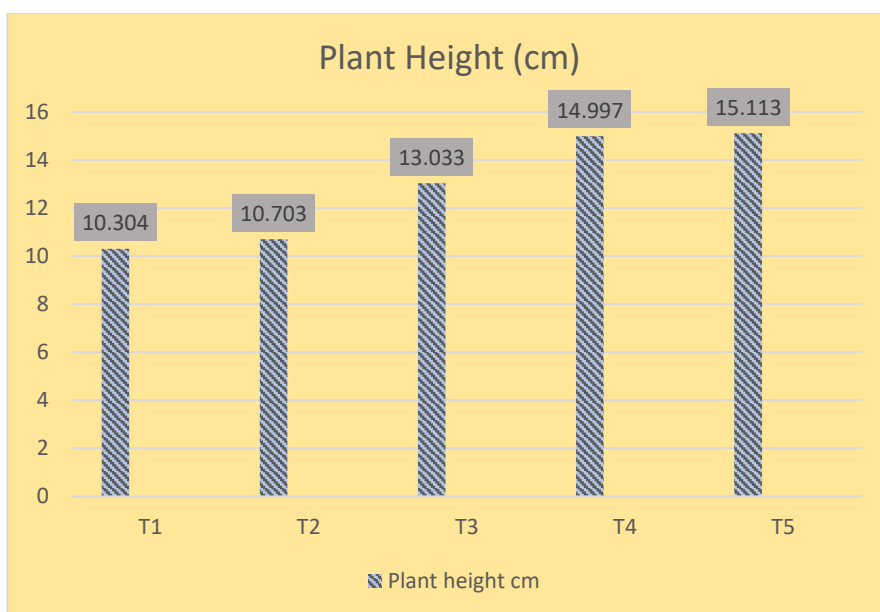


Figure No.1: Response of potting media on plant height (cm) of marigold.

Number of Branches per Plant

The branches per plant results shown in Table 1 showed significant effects of various potting media. T_5 = 30% Farmyard manure + 30% poultry manure + soil resulted in more branches per plant (4.64), closely followed by T_4 = 50% silt + soil and T_3 = 50% poultry manure + soil, (4.54) and (3.90) branches per plant, respectively. The decreased in T_2 = 50% Farmyard manure + soil caused a decline in branches to (3.15) per plant. And while T_1 = Soil =Control-No manure further decreased branches to (2.88) per plant.

Table no 1: Response of potting media on number of branches per plant and Number of flowers per plant of marigold.

Treatment	No. of branches per plant	No. Of flower per plant
T_1 = Soil =Control-No manure	2.88	16.31
T_2 = 50% Farmyard manure + soil	3.15	16.90
T_3 = 50% poultry manure + soil	3.90	20.72
T_4 = 50% silt + soil	4.54	23.94
T_5 = 0% Farmyard manure + 30% poultry manure + soil	4.65	24.13
Probability Value	0.0000	0.0001
Fisher Value	35.77	27.14
CV %	6.06	6.07

Number of Flower Plant

The marigold flowers per plant results shown in table 1 showed significant effects of various potting media. ANOVA showed that number of flowers was very significantly ($P < 0.05$) affected by various ratio of manures treatment. It is evident from the results that 30% Farmyard manure + 30% poultry manure + soil T_5 produced maximum Number of flowers per plant (24.13), followed by (23.94) and (20.72) flowers per plant recorded in treatments T_4 = 50% silt + soil and T_3 = 50% poultry manure + soil, respectively. The treatments based on 50% Farmyard manure + soil = T_2 resulted in (16.90) flowers per plant and minimum number of flowers per plant (16.31) was observed from T_1 = Soil =Control-No manure.

Fresh Biomass of Flower (g)

The Fresh biomass of flower (g) of marigold results presents in figure-2 showed important effect of various potting media. The mean of treatment for Fresh biomass of flower (g) was very significant. Results for maximum Fresh biomass of flower (210.45 g) were observed at T₅= 30% Farmyard manure + 30% poultry manure + soil followed by T₄= 50% silt + soil (204.84 g). Fresh biomass of flower (g) decreases in T₃ = 50% poultry manure + soil, and in 50% Farmyard manure + soil =T₂ Fresh biomass of flower (g) (192.75, 174.52 g). Was obtained. As a further result, a minimum Fresh biomass of flower (150.26 g) from T₁ = Soil =Control-No manure was observed, ANOVA demonstrated that Fresh biomass of flower (g) treated with various pinching was very significant (P < 0.05).

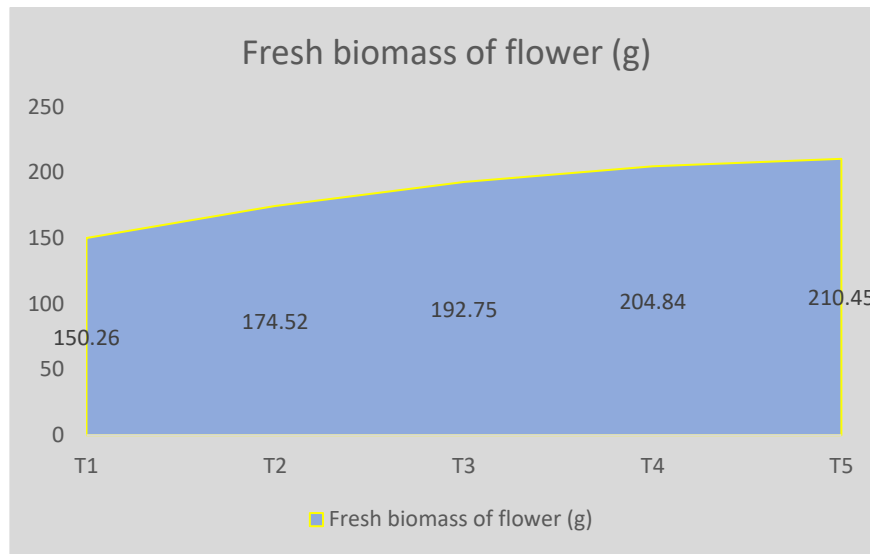


Figure No.2: Response of potting media on fresh biomass of flower (g) of marigold.

Flower Diameter (cm)

The flower diameter of marigold results shown in figure 3 showed significant effects of various potting media. 30% Farmyard manure + 30% poultry manure + soil = T₅ resulted in diameter of flower cm (15.11), closely followed by T₄= 50% silt + soil and T₃ = 50% poultry manure + soil with (14.99) and (13.03) diameter of flower cm, respectively. The decreased in T₂ =50% Farmyard manure + soil caused a decline in diameter to (10.71) of flower cm. while Soil =Control-No manure = T₁ further decreased flower diameter cm to (10.34)., ANOVA demonstrated that Diameter of flowers treated / growing in different ratio of manure was very significant (P < 0.05).

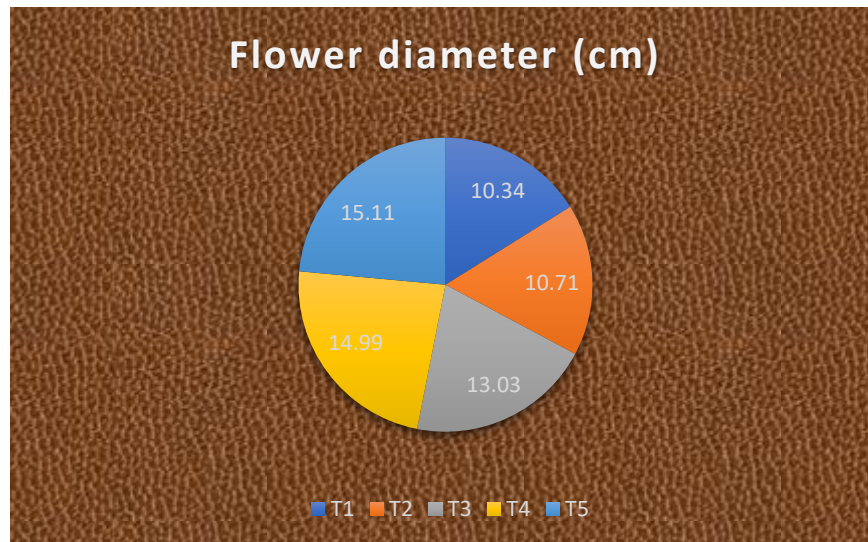


Figure No.3: Response of potting media on flower diameter (cm) of marigold.

Discussion

Marigold is a heavily feeder and generally has the longer blooming period (Aminifard, et al 2014). Increase in the Silt and Farmyard manure ratio increased total number of flower and inflorescence number (Litoriya, N. S., Gandhi, K. & Talati, J. G., (2014). The marigold receiving Canal silts + poultry manure + + farmyard manure (2:1) resulted in (31.15 cm) plant height, (50.06) leaves plant⁻¹, (53.83) days to flower bud initiation, (21.50) number of flowers per plant⁻¹, (11.58 g) weight of single flower, (33.51 mm) diameter of single flower and (57.00) days to flower persistence. After reviewing the data of this study, it was determined that marigold growth and flowering behaviors showed significant and positive response to farmyard manure ratios, and marigold treated with Canal silt + FYM (1:1) dust produced the longer plants with heavier and more flowers and blooming period as well. The response of varieties used in the study was also pronounced to different farmyard manure ration. The "Inca orange" produced much higher results than the "Bonanza harmony." (Koide, et al (1999), Barman, D., Datta, M. De, L. C. & Banik, S. (2017). found the greater height of the plants with the application of FYM and poultry in marigold plants.

CONCLUSION

Result of this experiment show significant Growth and yield response of marigold to potting media containing different ratio of manures. has effect on the growth and yield of marigold, including Plant height (cm), number of branches per plant, number of flowers per plant, fresh biomass of flower (g), and flower diameter (cm).

REFERENCE

- Aminifard, M. H., Aroiee, H. Fatemi, H. Ameri, A. & Karimpour, S. (2014). Responses of marigold to different rates of nitrogen under field conditions. *Journal of Agriculture Science*, 11 (4): 453-458.
- Kumar, N., N. Kumar, J. P. Singh and H. Kaushik. 2016. Effect of GA₃ and Azotobacter on growth and flowering in African marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gaiinda. *The Asian J. Hortic.*, 11: 382-386. <https://doi.org/10.15740/HAS/TAJH/11.2/382-386>
- Regaswamy, D. and J. Koilpillai. 2014. Physicochemical Screening of *Tagetes erecta* Linn. *Proceedings of the World Congress on Engineering Vol I, WCE 2014, July 2 - 4, London, U.K.*
- Arora JS, Kaur A, Sidhu GS, Kaur A. Performance of carnation in polyhouse. *Jou.*

- Basu, S. D., Roy, S. K., 1975. *Rotylenchulus* sp. a new ecto parasitic nematode in ted soil. Two and Bud (22 (1), (17) Em). In: Abst, C. F. H., Tocklia Experimental Station Horhat, Aaaaem, India, vol. 46. Breeding for Resistance to Fungal Pathogens. Canadian Journal of Botany 68, 1039–1044 (1976).
- Rahbarl, M., Omid, M. and Shahram, S. (2013). Organic Transplant Production of Pot Marigold in Vermicompost Amended Medium. Journal of Applied Science and Agriculture, 8 (5): 548-555.
- Blondo, R. J. and Noland, D. A. (2000). Floriculture: From Greenhouse Production to Floral.
- Acharya, M. M. and L. K. Dashora (2004). Response of graded levels of nitrogen and phosphorus on vegetative growth and flowering in African marigold. Journal of Ornamental Horticulture 7 (2), 25-31.
- Golestani, M., Dolatkahi, A. and Kazemi, F. (2013). Effect of planting dates on flowering period of *Calendula officinalis*, *Bellis perennis* and *Viola* spp. Advanced Crop Science 3 (8): 563-567.
- Ali, E. F. and Hassan, F. A. (2013). Impact of Foliar Application of Commercial Amino Acids Nutrition on the Growth and Flowering of *Tagetes erecta* L. Auge, R. M., 2001. Water relations, drought and vesicular arbuscular mycorrhizal symbiosis. Mycorrhiza 11, 3–42.
- Sasikumar, K., Baskaran, V., Abirami, K., 2015. Effect of pinching and growth retardants on growth and flowering in African marigold cv. Pusa Narangi Ganda. Journal of Horticultural Sciences, 10 (1), Pp. 109-111.
- Hartmann, H. T., Kester, D. E., Davies Jr., F. T. and Geneve, R. L. 2007. Plant Propagation: principles and practices (7th ed.). Prentice- Hall Inc., New Delhi. in Vermicompost Amended Medium. Journal of Applied Science and Agriculture, 8 (5): 548-555.
- Litoriya, N. S., Gandhi, K. & Talati, J. G., (2014). Nutritional Composition of Different marigold Varieties. Indian Journal of Agricultural & Biological Sciences, 27 (1), pp. 91-92.
- Koide, R. T., Landherr, L. L., Besmer, Y. L., Detweiler, D. M., Holcomb, E. J., 1999. Strategies for mycorrhizal inoculation of six annual bedding plant species. HortScience 34, 1217- 1220.
- Barman, D., Datta, M. De, L. C. & Banik, S. (2017). Efficiency of phosphate solubilizing and phytohormones producing bacteria on the growth and yield tuberose in acid soil of Tripura. India Journal of Horticulture, 60 (3): 303-306.